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3. A method according to [claim 1 or 2,] claim 1, whereby the tissue block is positioned relative to the cutting members in a predetermined orientation corresponding to the orientation of tissue block in vivo.

4. A method according to [any of the previous claims,] claim 1, whereby the tissue block is placed for cutting on a support surface and held in the predetermined position by applying a vacuum to one or more suction pads in the surface underneath the tissue block.

5. A method according to [claim 1 to 4,] claim 1, wherein the cutting members are mounted on a frame for engaging and sectioning the tissue block placed underneath the cutting members.

7. A method according to [any of the previous claims,] claim 1, whereby the tissue block is centrally positioned on the support surface before the cutting action.

10. An apparatus according to [claim 8 or 9,] claim 8, wherein the distance between the cutting members can be adjusted.

11. An apparatus according to [any of the claims 8 to 10,] claim 8, wherein the tension of the cutting members can be adjusted.

12. An apparatus according to [any of the claims 8 to 11,] claim 8, wherein the cutting members are razor blades.

13. An apparatus according to [any of the claims 8 to 11,] claim 8, wherein the cutting members are wires.

14. An apparatus according to [any of the previous claims,] claim 1, wherein the support surface is provided with positioning means for allowing accurate positioning of a tissue block, preferably embedded in an embedding having predetermined reference surfaces.

15. An apparatus according to [any of the previous claims,] claim 1, wherein the support surface is provided with vacuum supply means for retaining the tissue block in a predetermined position.

16. An apparatus according to [claim 14 or 15,] claim 14, wherein a centring means with a laser pointer are provided for accurate positioning of the tissue block on the support surface.

17. An apparatus according to [the claims 14 to 16,] claim 14, wherein concentric centring marking circles are provided in the support surface and possibly supplemented with aiming crossing lines.

18. An apparatus according to [the claims 14 to 16,] claim 14, wherein concentric recesses are provided in the support surface.

19. An apparatus according to [any of the claims 14 to 18,] claim 14, wherein concentric circular suction rings are provided that can be supplied with vacuum from the vacuum supply means for retaining the tissue block.

20. An apparatus according to [any of the previous claims,] claim 1, wherein the cutting members are connected to vibration means for vibration during the slicing action.

22. An apparatus according to claim 21 [and any of the claims 14 to 19,] wherein the vacuum in the vacuum supply means is generated by vacuum generating means connected to the pneumatic supply means.

23. An apparatus according to [any of the claims 8 to 22,] claim 8, wherein the driving means comprise pillar guiding means provided on the support surface and linear actuation means for linear movement of the sectioning means towards the support surface along the path defined by the pillar guiding means.

27. A method of preparing a tissue block for pathological examinations by encasing the tissue block in a tissue embedding in order to obtain a tissue block that is provided with reference positions for use in a method of cutting the tissue block according to [any of claims 1 to 7] claim 1 in an apparatus [according to any of claims 8 to 26,] for cutting of a tissue block in slices with a predetermined orientation in the tissue block for obtaining a direct correlation of CT, MR or PET images for pathological examination, said apparatus comprising a support surface for receiving a tissue block, sectioning means comprising a multiple of cutting members, and driving means for moving the sectioning means towards the support surface for slicing a tissue block into sections, said method comprising the steps of

filling a moulding form with an appropriate amount of non-toxic, biologically inert polymer moulding material, said form having at least one reference surface, and positioning a tissue block in said polymer moulding material in a predetermined position relative to said at least one reference surface, while the polymer moulding material is in its soft state.

29. A method according to [claim 27 or 28,] claim 27, whereby the tissue block is embedded in a bottom mould part and a top mould is formed in a top moulding form that is filled with polymer moulding material and placed on top of the lower moulding part with a partly encased tissue block, so that the tissue block is completely encased by the moulding.

30. A method according to [any of the claims 27 to 29,] claim 27, whereby the tissue block is fixed to a reference moulding of predetermined dimensions and whereby said reference moulding is pivoted into a predetermined position in one or more directions, and then moulded into at least a bottom moulding.

31. A method according to [any of the claims 27 to 30,] claim 27, whereby the polymer material is a cold polymerisate that polymerises by addition of water, such as a alginate plastic polymer.

32. An apparatus for producing a tissue embedding according to a method according to [any of the claims 27 to 30] claim 27 for use in an apparatus [according to any of the claims 8 to 26,] for cutting of a tissue block in slices with a predetermined orientation in the tissue block for obtaining a direct correlation of CT, MR or PET images for pathological examination, said apparatus comprising a support surface for receiving a tissue block, sectioning means comprising a multiple of cutting members, and driving means for moving the sectioning means towards the support surface for slicing a tissue block into sections, said apparatus comprising

first moulding means defining a reference moulding form for embedding a tissue block in a moulding, said first moulding means comprising an tubular side portion and first bottom plate means providing a bottom surface in the reference moulding form,

positioning means comprising at least one set of pivoting means for pivoting a reference mould, and

second moulding means for defining a bottom moulding form, said second moulding means comprising a retractable, tubular side wall and a second plate means for providing a bottom surface in the bottom moulding form.

34. An apparatus according to [claim 32 or 33,] claim 32, wherein a centrally disposed, retractable piston having a hemispherical end portion that extends into and forms part of the reference mould form when extended.

35. An apparatus according to [any of the claims 32 to 34,] claim 32, wherein the pivoting means comprise two oppositely disposed, aligned pins that are provided in the outer edge region of the second moulding means and are radially insertable in the reference mould defining a pivot axis for pivoting the reference mould into a desired position.

37. A tissue embedding for providing predetermined reference surfaces for accurate positioning of a tissue block in an apparatus [according to any of the claims 8 to 26] for cutting of a tissue block in slices with a predetermined orientation in the tissue block for obtaining a direct correlation of CT, MR or PET images for pathological examination, said apparatus comprising a support surface for receiving a tissue block, sectioning means comprising a multiple of cutting members, and driving means for moving the sectioning means towards the support surface for slicing a tissue block into sections, for the performance of a method according to [any of the claims 1 to 7,] claim 1, whereby a tissue block, such as an internal organ, or another internal anatomical structure is at least partly fixed in a mould having a predetermined reference surface, preferably a bottom surface for accurate positioning in an apparatus for sectioning said tissue block for pathological examination purposes, said tissue embedding comprising mould parts made of a non-toxic plastic polymer material, in particular an alginate plastic polymer.

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ABSTRACT

The present invention relates to a tissue embedding procedure and an apparatus for sectioning of irregular tissue blocks in slabs with section planes in the same orientation as any scanning plate used in CT, MRI, or PET scanning. Using an embedding apparatus the tissue block is embedding into an algino plastic polymer with defined regular outer surfaces adapted to the sectioning apparatus. The embedding procedure allows tissue and organs with irregular surfaces such as e.g. brain and kidney to be cut in a reproducible fashion and in any orientation. The machines consists of an array of long razor blades in a frame that be lowered through the action of crank. The razor blade frame is set into vibration by a pneumatic vibrator. The alginate tissue block is kept in place by vacuum produced by pressurized air flow valve.